SmartScan Z1001 BT

Electronic RFID Reader
MultiChip ISO/AVID
Extensive Manual

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The Z1001BT Smart Scan Reader OPERATING MANUAL

1.   Introduction

This reader can read all brands of 9, 10 and 15 digit microchips. All electronic chips (complying with standard ISO 11784/5), FDX-A, FDX-B, FACAVA and AVID encrypted chips. It won't read the discontinued AKC Trovan chips.

The Z1001 SmartScan Tag Reader is a handheld ID reader for TN and other RF-ID tags. The Z1001 SmartScan Tag Reader combines portability, versatility and optimum performance in a rugged lightweight functional design.

Weighing only 300g (0.66 lbs) with 9 volt alkaline batteries installed for ease of shipment and recycling, the Z1001 SmartScan Tag Reader is capable of over 2,000 read operation on a single set of batteries.

The Z1001 SmartScan Tag Reader is ideal for many types of field uses and can additionally serve in the laboratory or fixed industrial environment.

2.   Function Description

Figure 1. Z1001B SmartChip Scanner/Reader

2.1   Power Switch

The Power Switch on the right of the reader turns the unit ON and OFF. Slide the Power Switch firmly and then press the read switch. The unit will turn ON. The LCD display will announce " *reader ready* ISO/FECAVA / AVID", and the buzzer will produce two short high pitched beeps. The Power Switch must be ON for all reader functions to be used.

Slide down the Power Switch to turn the unit OFF. The LCD DISPLAY will go blank, and no additional tone will sound.

REMEMBER TO TURN THE POWER OFF WHEN THE READER NOT IN USE,

Please Note: For HID Bluetooth version, slide up to " ON 🟦" instead of "ON" position for requiring the use of HID Bluetooth function.

2.2   READ switch

The READ switch on the middle of the reader controls the reader's active seeking for an ID tag.
The READ switch is a momentary switch: as long as you hold it in the reader will be seeking an ID tag. During the time the reader is scanning for an ID tag, the LCD display will display

            SCANNING...

When the reader locates and reads an ID tag, it will display the ID number and sound two short high-pitched beeps.

When you let go of the READ switch;

    i) if the reader has displayed a tag number, it will continue to display the number until
        you depress the READ switch again to look for a new tag.

    ii) if the reader has not located an ID tag , it will sound a low pitched single beep, and the
         LCD DISPLAY will display

              NO ID FOUND

As soon as an Identity Tag number is found and displayed on the LCD display, the reader stops looking for another Identity Tag. So, to read several Identity Tags in sequence, the READ switch must be pressed and released for each one.

          TO PRESERVE BATTERY LIFE, ONLY DEPRESS THE READ SWITCH WHEN
          YOU ARE ACTIVELY LOOKING FOR AN ID TAG.

2.3   LCD Display

The LCD DISPLAY is the information center for the reader. It provides 2 lines of 16 character alphanumeric display of all reader functions and ID tag numbers found.

The display outputs the following messages:
          *Reader Ready *
          ISO/FECAVA/AVID   Displays when reader is first turned ON and battery is OK.
          SCANNING…   Displays when seeking an ID tag
          No ID Found   Display after termination of LOOKING when no valid tag is read.
          Low Battery   Displays when low battery is sensed, either when the unit is switched
                                 ON or instead of SCANNING…when the READ switch is depressed.

AVID*123*456*789   Sample display for a valid AVID Identity Tag.
999123456789012   Sample display for a valid ISO Identity Tag.
0000000001   Sample display for a valid FDX-A Identity Tag.

Other ID codes or messages may be displayed on special version of the Z1001BT READER. Please contact us for details.
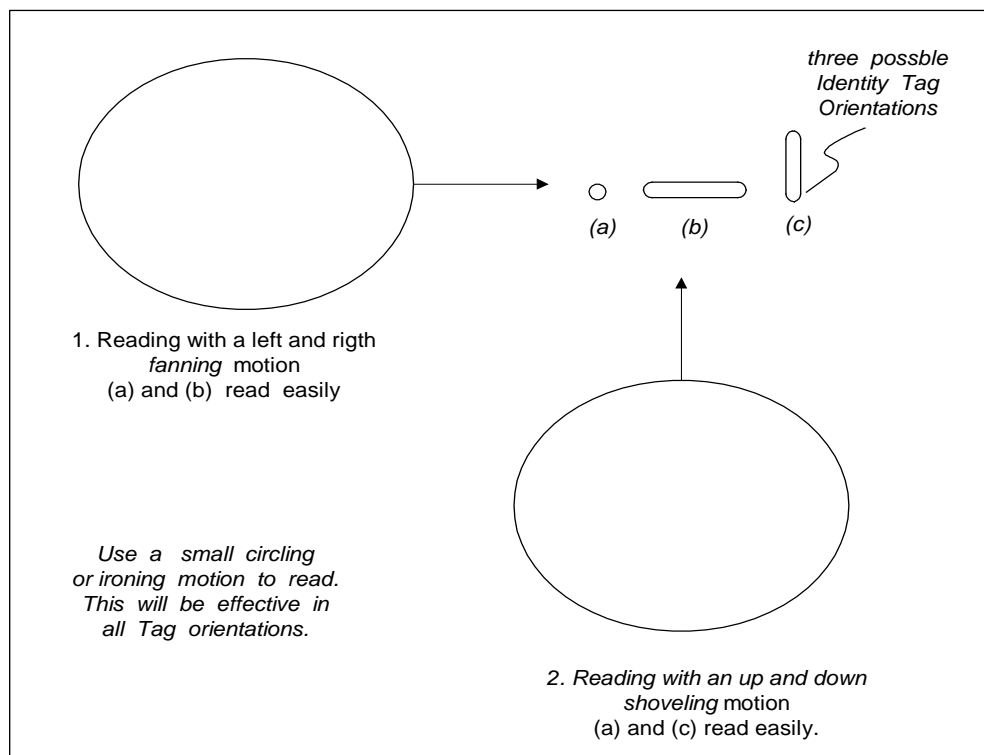
2.4　Read Antenna

The READ ANTENNA, shown in FIGURE 1, is the interface between the reader and the ID tag. The READ ANTENNA emits a low frequency RF electromagnetic signal to activate the ID tag and read the code in them.

If you understand how the tags interact with the READ ANTENNA, you will be able to save time and obtain the optimum reading range for each type of ID tag.

The following diagram (Figure 2) shows the best reading angle and position for the relation between the READ ANTENNA and the Identity Tag (Microchip).

The orientation of the reader antenna to the implant affects the range and ability to read.

three possble Identity Tag Orientations

(a)　*(b)*　*(c)*

1. Reading with a left and rigth *fanning* motion (a) and (b) read easily

Use a small circling or ironing motion to read. This will be effective in all Tag orientations.

2. Reading with an up and down shoveling motion (a) and (c) read easily.

Figure 2 Reading Technique

In order to get a good read, the implant must either be:

i)   point at the center reader antenna (orientation a) or,
ii)   when parallel to the reader antenna plane (orientation b and c) pointing toward the edge of the reader antenna and be near the edge of the reader antenna.

So, referring to Fig.2 above, the following results will be typically:

1. Left and right fanning motion.

(a) read will be best when the implant is directly over the center of the reader antenna.
(b) read will be best with the leading or trailing edge of the reader antenna passed over the implant.
(c) very low range or no read in this orientation.

2. Up and down shoveling motion.
   (a) read will be best when the implant is directly over the center of the reader antenna.
   (b) very low range or no read in this orientation.
   (c) read will be best with the leading or tailing of the reader antenna.

In other words, when the implant is parallel to the reader antenna, as it would likely be in a subcutaneous application, the motion used to read the implant will be important. If standard Implant sites and injection techniques are used, the orientation of the implant should be fairly predictable. But, in order to ensure that a read is done, a combination of the two motions above, or a circular ironing motion will be most effective.

This behavior is result of intrinsic nature of the underlying technology. Therefore good reading technique is important in getting reliable reading performance.

The orientation of the reader antenna to the implant affects the range and ability to read. In order to get a good read, the implant must either be:
   i)   pointing at the center of the reader antenna (orientation (a)) or,
   ii)   when parallel to the reader antenna plane (orientation (b) and (c)) pointing toward the edge of the reader antenna and be near the reader antenna.

2.5 Battery Compartment

Figure 3. Battery Placement

The *BATTERY COMPARTMENT* holds the one 9 volt alkaline battery used to power the reader. The BATTERY COVER is shown in its CLOSED position in FIGURE 3.

To access the batteries, loosing battery back cover and remove Battery cover.

WARNING: MAKE SURE THE BATTERIES ARE INSERTED IN THE PROPER DIRECTION.

(Fig 3.) USE ONLY ALKALINE 9 V.

WARNING: DISPOSE OF USED ALKALINE BATTERIES WITH EXTREME CARE.
BATTERIES MAY EXPLODE IF DISPOSED OF IN FIRE.

2.6   Computer Interface Connector

The COMPUTER USB INTERFACE CONNECTOR is located left side of the body. Using the USB CABLE, you can interface the reader to any computer with an USB port. See Section 4. "USE WITH COMPUTERS" for a detailed explanation of interfacing the Z1001 SmartScan Tag Reader to a computer. All Function of the Z1001 SmartScan Tag Reader are available using the USB INTERFACE CONNECTOR.

3.   Normal operation

3.1   Power-up

Install battery, to Z1001 SmartScan Tag Reader.

Slide up Power Switch To power on position. The LCD DISPLAY should come on and read " *reader ready* ISO/FECAVA / AVID", and the reader should emit two high tones. The reader is now ready for operation.

If the display reads LOW BATTERY and the reader emits a single low tone, either the battery is low.

If the battery is low, the reader will still function, but the reading distance will be reduced, and the batteries should be replaced. When the batteries are exhausted, the LCD DISPLAY will fade, and the reader will no longer function.

3.2   Reading ID Tags

To read an ID tag with the Z1001 SmartScan Tag Reader, position the reader as close as possible to the location or suspected location) of the ID tag, press the READ switch, and search for the tag with a slow rotary motion of the READ ANTENNA until an ID is found or until you decide to abandon searching for the tag.

The READ switch is a momentary switch: as long as you hold it in reader will be seeking an ID tag.

During the time the reader is looking for an ID tag, the LCD display will read SCANNING…

When the reader locates and reads an ID tag, it will display the ID number and sound two
High – pitched beeps.

When you let go of the READ switch,

- if the reader has displayed a tag number, it will continue to display the number until you depress the READ switch again to look for a new tag.
- if the reader has not located an ID tag, it will sound a low – pitched single beep, and the LCD DISPLAY will read NO ID FOUND

Note: **TO PRESERVE BATTERY LIFE, ONLY DEPRESS THE READ switch WHEN YOU ARE ACTIVELY LOOKING FOR AN ID TAG.**

The display outputs the following messages:

Ready Ready	Displays when reader is first turned ON and battery is OK.
SCANNING…	Displays when seeking an ID tag.
No ID Found	Displays after termination of LOOKING when no valid tag is read.
Low Battery	Displays when low battery is sensed, either when the unit is switched ON or instead of "Scanning… " when the READ switch is depressed.
AVID*123*456*789	Sample display for a valid AVID tag.
999123456789012	Sample display for a valid ISO Tag.
0000000001	Sample display for a valid FDX-A Tag.

The READ ANTENNA, shown in FIGURE 1, is the interface between the reader and the ID tag.

The READ ANTENNA emits a low frequency RF electromagnetic signal to activate the ID tag and read the code in them.

If you understand how the tag interact with the READ ANTENNA, you will be able to save time and obtain the optimum reading range for each type of ID tag.

The following picture shows the best reading angle position for the relation between the READ ANTENNA and Identity Tag.

orientation b

Figure 4. Reading Technique

The orientation of the reader antenna   to the reader antenna to the implant affects the range and ability to read. In order to get a good read, the implant must either be:

        i)   parallel to the reader antenna (orientation a) or,
        ii)   pointing at the corner of the reader antenna (orientation b)

So, referring to Fig.4 above. This behavior is a result of the intrinsic nature of underlying technology. Therefore, good reading technique is important in getting reliable reading performance.

3.3   Interference from RF Sources

The Z1001 SmartScan Tag Reader senses minute variations in electromagnetic fields in order to read ID signals from the Identity Tags.

Unfortunately, there are many sources of electromagnetic radiation which can interfere with the signals from the ID tags and thereby decrease the sensitivity of the reader. This results in reduced reading distance.

Known sources of interference include the following: Computer CRT screens, TV sets, some kids of switching power supplies, some kids of large motors.

Reader sensitivity to kids of interference sources is highly dependent on the proximity to the interference source and sometimes to the angle of orientation between the reader and the interference source.

If you are using the reader, and the LOW BATTERY indicator is not no, but you are experiencing a marked decrease in reading distance, then the reader is probably being affected by electromagnetic interference.

To improve the situation, try changing the location or orientation of the reader. You will be able to t ell what the offending interference source is, since most electromagnetic interference fields only extend few feet from their source.

3.4   Operating near metal objects

Metal objects (especially ferrous metals) absorb electromagnetic fields. Operating either the Z1001 SmartScan Tag Reader or placing the Identity Tag too close to metal objects can severely limit the range of operation of the system.

If you are experiencing reduced operation range from your system, check for metal table tops, doors, etc. in close proximity (a few inches) to any part of the tag-reader environment.

Although interference due to electromagnetic absorption is a real possibility, it is often blamed incorrectly for reading problems. The system will work in the vicinity of large metal objects because the effects referred to here occur only in very close proximity to the reader and Identity Tag. For example, placing a bare implant directly on a metal table and attempting to read it.

3.5   Power-off

Remember to power-off the reader after use when operating with batteries.

The reader uses a small amount of power when it is ON, even when not reading. This will eventually drain the batteries.

Do not leave the reader ON for extended periods of time when you are not reading ID tags.

When you do not intend to use the Z1001 SmartScan Tag Reader for an extended period of time, remove the batteries to prevent possible damage to the unit from battery leakage. Store the reader and batteries in a dry place protected from sunlight, high heat and high humidity.
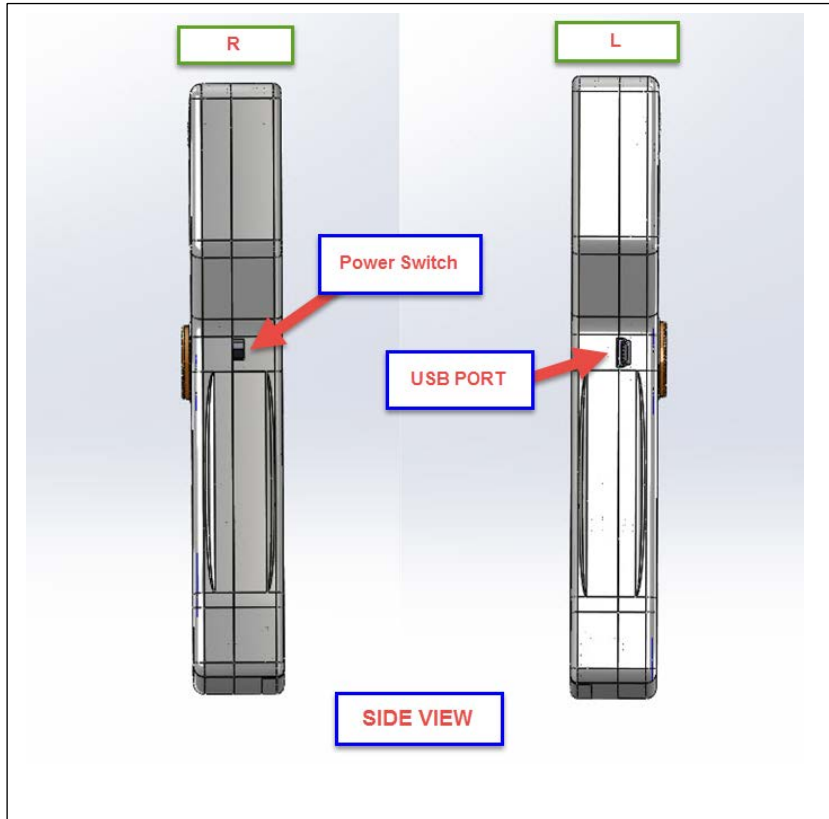
4.   Use With Computers via USB port

Figure 5. USB Connector

4.1   Computer interface functions

All of the function available to you during manual use of the Z1001 SmartScan Tag Reader are also available through the USB COMPUTER INTERFACE.

The USB COMPUTER INTERFACE operates in parallel with the manual reader function: in other words, the reader can be used in normal (manual) mode while it is connected to the computer.

The Z1001 SmartScan Tag Reader connects to a computer though the USB socket in the left compartment (Fig 5.) , using the general Interface USB cable .

Only ID. code displayed on the LCD DISPLAY are sent though the USB cable to the computer you are using.

The steps for interfacing the Identity Tag Reader to a computer are:

1.   open the computers' USB serial port using the Computer Interface Parameters listed in Table 2 below. (9600 baud, 8 data bits, 2 stop bit)

2. read the input as text lines (line sequential input). Only ID. code sent to the LCD display of the reader are also sent to the readers' USB serial port.

3. to initiate a read attempt using the computer interface, send a space character (or any other character will do) out of the computer to the reader. This will put the reader in SCANNING mode. The reader will stay in SCANNING mode until:
   - an Identity Tag is found
   - another character is received from the computer
   - the READ switch is depressed and released on the reader

4. by noting the status messages (SCANNING, TN ID READY, and LOW BATTERY) and processing the Identity Tag codes as they are received, the application software has complete control over the reader function.

4.2   Interface Cable

Use standard USB cable.

4.3   Support Software

Any software that communicates though the USB serial port can receive information from the Z1001 SmartScan Tag Reader.

EXAMPLE CODE IN VISUAL BASIC TO INTERFACE USB Serial com port TO THE READER

```
Sub init_comport()
        If common.MSComm1.PortOpen = False Then
        common.MSComm1.Settings = "9600,N,8,2"
        common.MSComm1.PortOpen = True
        common.mscomm1.CommPort =1
End if
End Sub
```

4.4   USB Serial com port Interface specifications

USB Serial com port	INTERFACE SPECIFICATION
BAUD RATE	9600 baud only
TRANSMIT BITS	**8**
PARITR	**none**
STOP BITS	**2**

TABLE 1. Computer Interface Parameters

Any character received by the reader will toggle the READ switch function.

NOTE: the SCANNING function will turn itself off when a valid tag is read.

4.5   Use with PC / Mobile phone/ Tablet computer via HID Bluetooth.

We will name all of the above device as a computerized device for better understanding.

1. Slide Power Switch to "ON ⍟ " position.

2.   HID Bluetooth will recognize the last status mode before turning off the reader.

3.   If it is in the "connecting" mode, the "Bluetooth symbol on the LCD display will show "Blinking" slowly. If the connection is unsuccessful in 5 seconds, the Bluetooth symbol will change the status to Idle mode for 10-15 seconds and then change to "pairing" mode. The Blinking will become faster. The reader will keep "pairing mode" until the connection of 2 devices are successful.

4.   Turn on Bluetooth function of the computerized device which require to pair with Reader. In case your computerized device has its own language, you may be required to change the keyboard language to "English".

5.   Start pairing for both devices.

6.   "CSR HID Keyboard" or "keyboard" device name will be showed on the computerized device which requires to connect to Reader.

7.   Click on the name for connection.

8.   Once the connection of 2 devices is successful. The Bluetooth symbol on LCD display will be stable (no blinking). The ID code which the reader scans will display on the cursor position.

9.   If you turn off the Reader while the computerized device still keeps connecting on Bluetooth function. When you turn on the reader again the connection will be do automatically (Observe on the Bluetooth symbol will be stable).

10.   In case the Reader returns back into the pairing mode in any circumstance, remove " CSR HID Keyboard" device in the computerized device list and start pairing again.

5.   Specifications

5.1   Operating Frequency

The reader operates at 128.2 KHz.

5.2   Battery Life

The battery will last at least 2,000 read operation, assuming 2 seconds per read operation.

5.3   Read Distances

Using the HID Global 12mm Glasstag, and in the absence of interference sources, read distance is Minimum of 10cm (4 inches), perpendicular to the reader at the center of the reader antenna. This orientation is typical in intramuscular implantation.

The distance will be less as the orientation of the implant deviates from 90 degrees on center and as it is moved toward the edge of the reader antenna. See Figure 6.

With the implant parallel to the plan of the reader antenna, and at the edge of the reader antenna, the reading distance is 28mm (1-1/8 inches), this orientation is typical in subcutaneous implantation.

5.4   Physical Description

The Z1001 SmartScan Tag Reader is a one-piece hand-held unit made of high-impact plastic. The reader has two operating buttons located at the center and the right side of the body.

First, the power switch located at the right the handle, operated by the users' thumb, and used to turn the reader on and off.

Second, the read switch located at the center of the body operated by the users' thumb and used to initiate a read operation and/or terminate a read operation.

A battery compartment within reader handle is assessed though a cap placed at the back of the reader handle.

The reader status and output is displayed on a 2 lines of 16 chracter Liquid Crystal Display (LCD) located at the head of the reader and facing the operator.

The reader electronics are housed in the head area of the reader beneath the LCD. The reader antenna is at the top of the reader. It is controlled by the reader electronics.

6.   Accessories

6.1   Batteries

Use only 9 volts alkaline cells. Batteries are not included in initial unit/pack.

WARNING:
ORDINARY C-CELLS (CARBON 1.5 V. , ALKALINE 1.5V. , NICKEL-CADMIUM 1.2V. , LITHIUM 3.0 V.)
DO NOT HAVE ENOUGH VOLTAGE TO POWER THE READER!

7.   Warranty and Service

The Z1001 SmartScan Reader is warranted to be free of manufacturing defects for a period of 90 Days from date of purchase.

Defective readers will be repaired or replaced.

For further information please visit: www.swissplusid.com